

Umetco Minerals Corporation

INTERNAL
CORRESPONDENCE




PO BOX 579 4625 ROYAL AVENUE • NIAGARA FALLS NEW YORK 14302

To (Name) Messrs.
F. V. McMillen
Date May 2, 1986
Division D. G. Millenbruch
Originating Dept Niagara Falls, NY
Location Danbury, CT 06817
Area
Answering Letter Date
Subject
Copy to File

The Department of Energy has written George Parker, as the representative of Umetco, informing him that the Niagara Site is no longer to be included in the "Formerly Utilized Sites Remedial Action Program" and that they "are notifying the Environmental Protection Agency and the State of New York of this action . . ."

This should be of little concern to us at this time because of the extensive clean-up of the Technology Site over the past few years. However, one of the enclosures with their letter contains a good summary of the radiological history of our site. I thought you might find it interesting so I am forwarding the package for your leisure reading.


D. J. Hansen

DJH/dv/366h
Enclosure

UCCNHT0000148



Department of Energy
Washington, D.C. 20545

EMPLOYEE RELATIONS DEPARTMENT

APR 24 1986

APR 9 1986

Mr. George Parker, Manager
Employee Relationships, Safety, Health,
and Environmental Affairs
Umetco Minerals Corporation
P.O. Box 66
Niagara Falls, New York 14302

Dear Mr. Parker:

The Department of Energy is evaluating the radiological condition of sites that were utilized under the Manhattan Engineer District and/or the Atomic Energy Commission in the early years of nuclear energy development to determine whether they need remedial action and whether the Department has authority to perform such action. As you know from correspondence and contacts between your company and the Department or our contractors, the Umetco Minerals Corporation facility in Niagara Falls, New York (formerly Electro Metallurgical Company) was identified as one such site. A plant owned by the Manhattan Engineer District was operated in the 1940's at your site to convert uranium tetrafluoride to uranium metal. The enclosed documents provide a summary of the Department's review and are provided to you, as the owner's representative.

As indicated in the enclosed report of two preliminary surveys and the site summary report, no residual radioactivity was identified that could be associated with the Department's predecessor's uranium conversion operations. However, the surveys did identify concentrations of uranium and thorium and their decay products in the soil in excess of guidelines used by the Department to determine if a site warrants consideration for remedial action to eliminate restrictions on its use. This residual activity appears to be the result of commercial processing of ores that naturally contain uranium and thorium. On the basis of this data and a review of historical information, including contractual records, the Department has determined that it does not have authority under the Atomic Energy Act of 1954, as amended, to conduct remedial action, if necessary, at the site under the Formerly Utilized Sites Remedial Action Program.

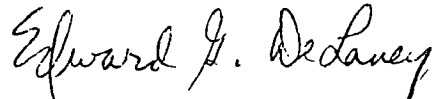
We are eliminating the site from consideration for inclusion in the Formerly Utilized Sites Remedial Action Program, and are notifying the Environmental Protection Agency and the State of New York of this action by copy of this letter.

Documentation supporting the Department's decision is available for public review at the Department's Public Reading Room located in Room 1E-190 of the Forrestal Building, 1000 Independence Avenue, S.W., Washington, D.C.

UCCNHT0000149

If you have any questions regarding this decision or the availability of the material at the reading room, please contact me at 301-353-4716.

Sincerely,



Edward G. DeLaney, Director
Division of Facility and Site
Decommissioning Projects
Office of Nuclear Energy

2 Enclosures

cc:

J. Spath, NY State ERDA
F. Bradley, NY State
B. Librizzi, EPA Region II
T. DeBore, NY State
H. Snyder, EPA, Wash., D.C.

UMETCO MINERALS CORPORATION,
(Former Electro Metallurgical
"Electromet" Company)
Niagara Falls, New York

Site Function

Manhattan Engineer District (MED) contract W-7405-Eng-14, initiated on November 14, 1942, called for the Electro Metallurgical Company (Electromet) to design, engineer, construct, and operate a plant to produce uranium metal from uranium tetrafluoride (UF₄, green salt). Expansion of the facility occurred under construction contracts W-7405-Eng-227 and 255. Electromet, a subsidiary of Union Carbide and Carbon Corporation, received UF₄ from Union Carbide's Linde Air Products Division plant at Tonawanda, New York, reacted it with magnesium in induction furnaces to convert it to uranium metal, and then recast the metal into 110- to 135-kilogram ingots. The products were generally shipped to either Hanford Engineer Works, Richland, Washington, Argonne National Laboratory, Argonne, Illinois, or Du Pont's Chambers Works, Deepwater, New Jersey, for testing, or to Simonds Saw and Steel Company, Lockport, New York, Vulcan Crucible Steel Company, Alliquippa, Pennsylvania, Revere Copper and Brass Company, Detroit, Michigan, or Joslyn Manufacturing and Supply Company, Fort Wayne, Indiana, for rolling. Process residues (dolomite slag, uranium chips, and crucible dross) were shipped to other sites for uranium recovery, storage, or disposal. These sites included the Atomic Energy Commission (AEC) portion of Lake Ontario Ordnance Works (LOOW), Lewiston, New York (now known as the Department of Energy (DOE) Niagara Falls Storage Site), Mallinckrodt Chemical Company, St. Louis, Missouri, Vitro Manufacturing Company, Canonsburg, Pennsylvania, the Du Pont Chambers Works, and Hooker Electrochemical Company, Niagara Falls, New York.

In addition to production of metal from green salt, Electromet recast scrap metal from Simonds, Chapman Valve Manufacturing Company, Indian Orchard, Massachusetts, and American Rolling Mill Company (location unknown). The contract also contained a provision for the conduct of research and development. Some work was done under this provision from April to October 1945. The exact nature of the work is not known, but it may have involved low- and/or high-grade uranium ores.

Production of uranium metal was suspended in August 1946 and resumed in October 1947. On November 30, 1948, Electromet was liquidated as a separate company and became the Electro Metallurgical Division of Union Carbide and Carbon Corporation. All rights, assets, liabilities, and contracts were transferred to Union Carbide. Production continued until September 28, 1949, when the last casting of uranium was conducted. The plant was placed in standby condition two days later.

Electromet also supplied calcium metal to Los Alamos Scientific Laboratory, Iowa State College, and AEC's Santa Fe Yards under contracts W-26-021-Eng-13, AT (30-1)-Gen-137, 160, and 225, and AT-04-1-Gen-55, 56, 57, 78, 91, and 101 (1945 to 1948). In April 1950, the UF₄-to-metal plant was reactivated for casting zirconium metal sponge into ingots for the Naval Critical Requirement program. The work was conducted under W-7405-Eng-14 and funded under AEC contract AT(30-1)-861 with Titanium Alloy Manufacturing Division of National Lead Company (supplier of the zirconium). The plant was returned to standby condition at the completion of the work in September 1950. Portions of the facility were subsequently used under contract AT-(40-1)-1090 between Union Carbide and Carbon Research Laboratories, Inc., and AEC's Oak Ridge Operations Office. This contract directed Union Carbide to conduct research and development on methods of forming metal that would minimize unnecessary machining, finishing, and waste. This work was conducted from January to June, 1951. Although the contract is not specific, the metal involved was probably uranium. Later, just prior to demolition, the building was also apparently used for titanium processing (contract number unknown). AEC involvement at the site ended when contract W-7405-Eng-14 expired on June 30, 1953.

Following the termination of the MED/AEC contracts, Electromet processed ores containing uranium and thorium for commercial use under New York State radioactive material license 950-0139. From August 1965 through April 1972, Union Carbide Corporation produced 505 tons of slag bearing 9212 pounds of thorium dioxide and 1293 pounds of uranium oxide. This slag material was placed in 55-gallon drums and buried in a designated area on plant property in a hole 20 feet deep with 4 to 5 feet of soil cover.

"Cecos"
G/H

Site Description

The Electromet site is located south of Pine Avenue and east of its intersection with Packard Road (Figure 1). The MED/AEC operations took place in only one building, a one-story cinder block and wood structure that was demolished in 1957. It was located approximately 400 feet east of 47th Street and 400 feet south of Royal Avenue, in an area now occupied by the south end of current Building 166.

Owner History

This facility was part of what is now known as Umetco Minerals Corporation, a subsidiary of Union Carbide Corporation. During the MED/AEC period, the facility was called Electro Metallurgical Company, and was a subsidiary of Union Carbide's predecessor, Union Carbide and Carbon Corporation.

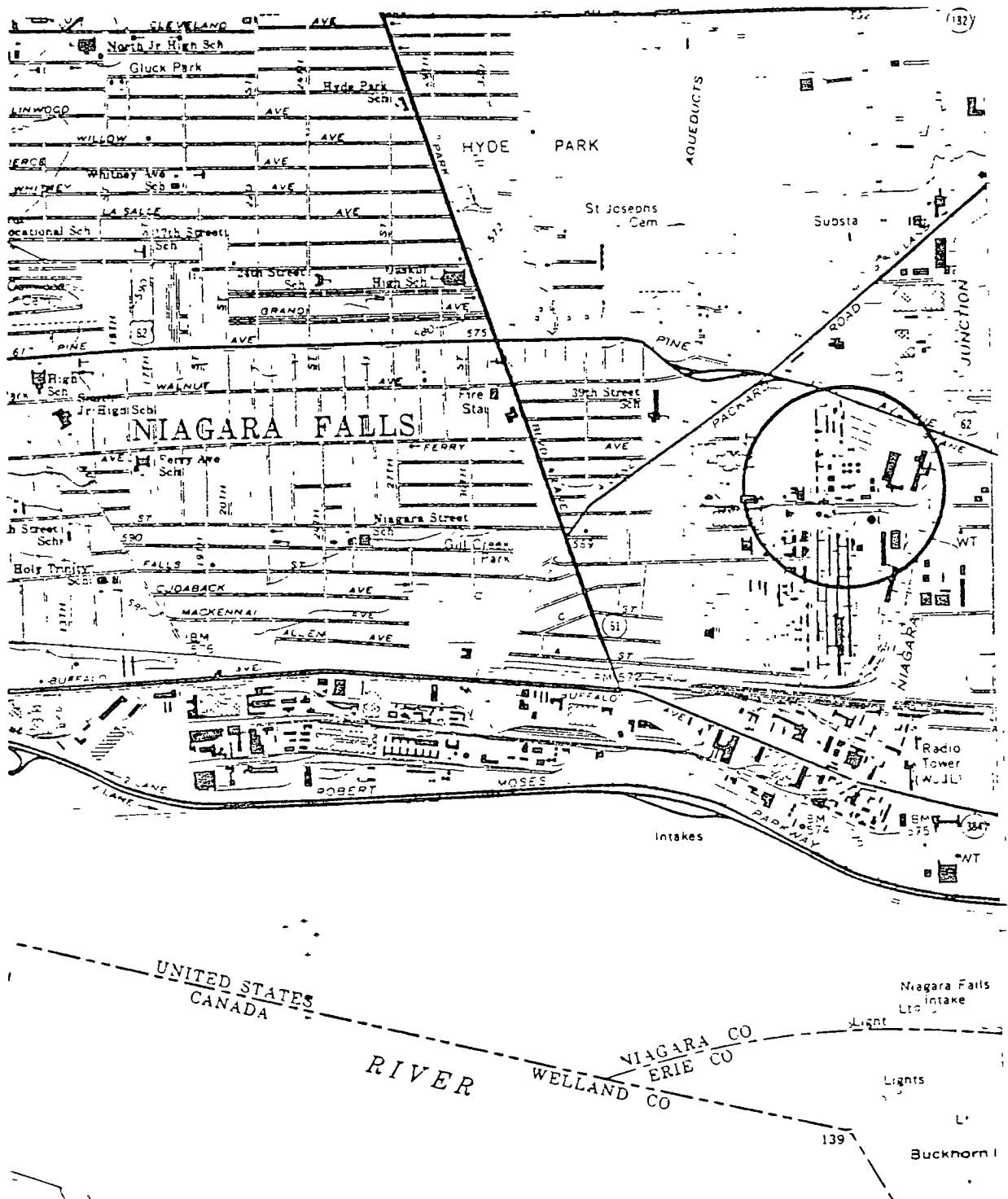


Figure 1. Location of the Former Electro Metallurgical Company in Niagara Falls, New York

Radiological History and Status

At the end of the contract, Electromet purchased the facility from AEC. The plant and equipment were decontaminated through washing, vacuuming, and in some locations, removing concrete floors and wooden platforms. The Health and Safety Division of AEC surveyed the site on August 11 and 14, 1953. Final radiological certification of the condition of the plant and a recommendation to release the facility were made on September 28, 1953. The building was later demolished with debris and uranium processing wastes transferred to the AEC portion of LOOW. In the late 1950s, the wastes from uranium processing were subsequently sent to Oak Ridge National Laboratory (ORNL) for permanent disposal. However, some of the rubble may have been deposited in the old Union Carbide dump (200 to 300 acres located north of Pine Avenue and owned by Newco, now CECOS International, Inc.).

On August 24, 1976, personnel from ORNL and the DOE (then the Energy Research and Development Administration) Oak Ridge Operations Office conducted a screening survey of the site and the old dump. Due to the near-background radiation levels encountered over most of the site, a comprehensive formal survey was not recommended. However, because of elevated (but within guidelines*) beta-gamma readings in the area between Buildings 163 and 166, additional measurements and soil sampling were advised. EG&G, Inc., conducted an aerial radiological survey of the Niagara Falls area in November 1978, and again with more sensitive instruments in September 1979. No radiation anomalies were observed on the Electromet site during either survey.

As a follow-up to the screening survey, ORNL personnel conducted another limited radiological survey on September 24, 1980. They found relatively high concentrations of gamma-emitting radionuclides (above guidelines*) in the thorium-232 and uranium-238 decay chains in the surface soil around Buildings 166 and 163 as well as elsewhere on the site. Residual radioactivity was also identified in cracks and seams in the walls and floor of Building 163. Thorium-bearing ores were used during operations at this site, however, the activities were unrelated to the MED/AEC work. The uranium-233/radium-226 ratio measured in the soil samples indicates natural uranium, whereas the MED/AEC uranium work involved work with uranium metal, i.e., produced after the uranium was separated from its daughters. Thus, the observed uranium contamination was apparently not the result of the MED/AEC conversion and metal-casting operations.

*U.S. Department of Energy Guidelines for Residual Radioactivity at Formerly Utilized Sites Remedial Action Program and Remote Surplus Facilities Management Program Sites, Rev. 1, July 1985.

Because the radioactivity at the UCC site is unrelated to MED/AEC work, DOE has determined that it has no authority under the Atomic Energy Act of 1954, as amended, to conduct any further activities at the Union Carbide Corporation site. The site has been eliminated from consideration for inclusion in the Formerly Utilized Sites Remedial Action Program. A final elimination report was completed in November 1985. As per DOE policy the Environmental Protection Agency and the State of New York have been notified of DOE's action so that they may take whatever action, if any, they deem appropriate.

PRELIMINARY SURVEY OF
ELECTROMET CORPORATION
UNION CARBIDE METALS DIVISION
NIAGARA FALLS, NEW YORK

Work performed
by the
Health and Safety Research Division
Oak Ridge National Laboratory
Oak Ridge, Tennessee 37830

March 1980

OAK RIDGE NATIONAL LABORATORY
operated by
UNION CARBIDE CORPORATION
for the
DEPARTMENT OF ENERGY
as part of the
Formerly Utilized Sites--
Remedial Action Program

ELECTROMET CORPORATION
UNION CARBIDE METALS DIVISION
NIAGARA FALLS, NEW YORK

At the request of the Department of Energy (DOE, then ERDA), a preliminary survey was performed at the former Electromet Plant (currently Union Carbide Corporation - Metals Division plant) in Niagara Falls, New York (see Fig. 1), on August 24, 1976, to assess the radiological status of those facilities utilized under Manhattan Engineer District (MED) contract during the period 1943 through 1946.

Robert D. Forgeng, Plant Manager, provided information about the contract operations and identified the former site of the one building (a cinder block and wood structure) utilized in the process. C. R. Allenbach and Don Hawkes also provided information as to the building location and project operations. Also, Bill Chynoweth, an employee at the plant during the MED contract period, provided information about operational processes and assisted in identifying the location of the building which was demolished about 1958.

The project involved receiving Green Salt (UF_4) in drums from the Linde Air plant at Tonawanda, New York, reacting the Green Salt in furnaces, converting it to metal, and then recasting it into ingots. The building was formerly located where Building 166 now stands and just west of Building 163 (see Figs. 2 and 3) which existed at the time of the project. The former process building was constructed of wood and cinder block and was about 18 x 46 m at one end and 14 x 46 m at the opposite end. Waste from the operation was disposed at the Lake Ontario Ordnance Works depot. Residues of dolomite slag liners (MgF_2 slag), uranium chips, and crucible dross associated with the process were shipped to other sites for uranium recovery.

Present Use of Facilities

The building utilized in the MED project was washed, vacuumed, and, in some locations, the concrete floor and some wood platforms were removed (see Report N04600). Following the project (post-1946), the building was used for zirconium processing from 1947 to 1948, and later titanium was processed prior to demolition. Building 166 (see Fig. 4)

was constructed on the site of the former process building, and it is currently used by Union Carbide's Metal Division operations.

Results of Preliminary Survey

The preliminary survey was performed by H. W. Dickson of the Oak Ridge National Laboratory and W. T. Thornton of the DOE/Oak Ridge Operations Office (then ERDA). Accompanying Dickson and Thornton during the survey was C. R. Allenbach, Don Hawkes, and Bill Chynoweth. Measurements taken at this site included external gamma-ray exposure rates taken at 1 m in height and beta-gamma dose rate taken at 1 cm from the surface. Results of the survey measurements were within background levels with the exception of slightly elevated background with maximum beta-gamma dose-rate readings of 0.1 mrad/hr at a location between Buildings 163 and 166. Survey measurements in sections of the old Union Carbide dump (200 to 300 acres and now owned by CECOS International, Inc.) located to the north of Pine Avenue (see Figs. 5 and 6) resulted in radiation levels that were not significantly above background levels. Some of the waste from the process and rubble from the demolition of the old building has been buried at this dump.

In view of the near background radiation measurements taken at this site, a comprehensive, formal survey will probably not be required. However, it is suggested as a precautionary measure to (1) obtain further measurements between Buildings 163 and 166 to define extent of elevated readings, (2) obtain a soil sample at location in (1) where maximum β - γ and external gamma measurements are observed, (3) drill core samples in the old Union Carbide dump to determine if any radioactive material has been deposited in this area.

A formal survey of this facility was performed as part of the dismantlement and decommissioning of Electromet by the Health and Safety Division of the AEC on August 11 and 14, 1953. The results of this survey are reported in the attached document.

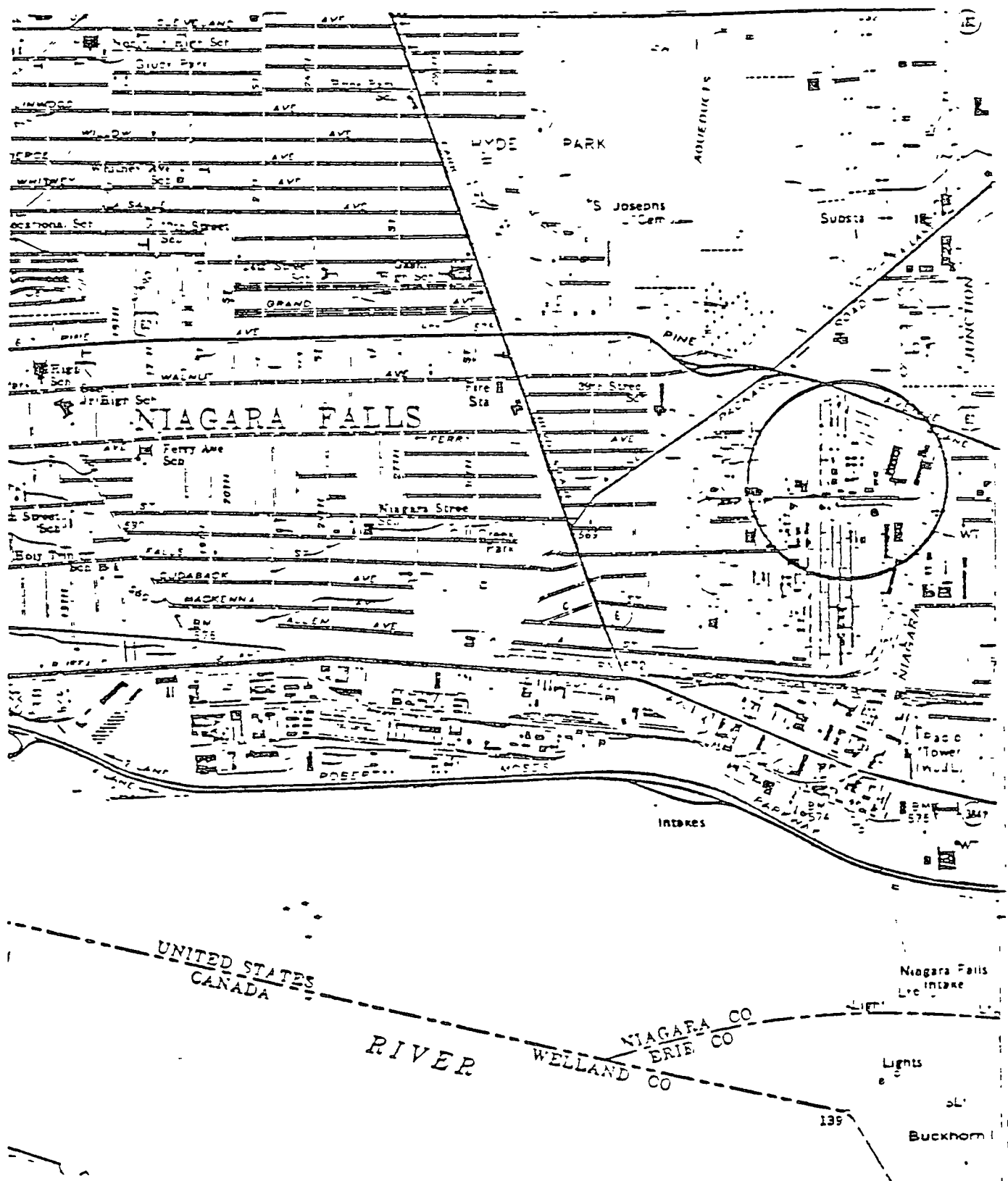


Fig. 1. Location of the Electromet Corporation - Union Carbide Metals Division site in Niagara Falls, New York.

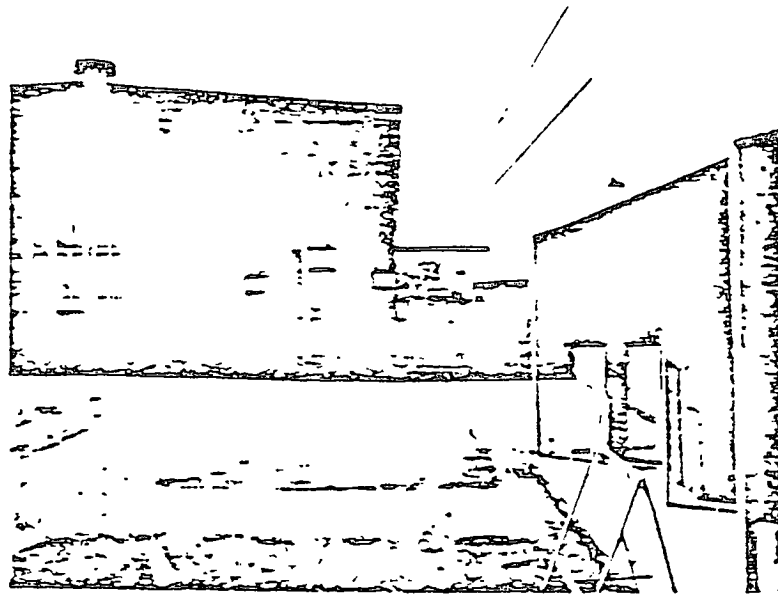


Fig. 2. North end of Building 163 and east side of Building 166.

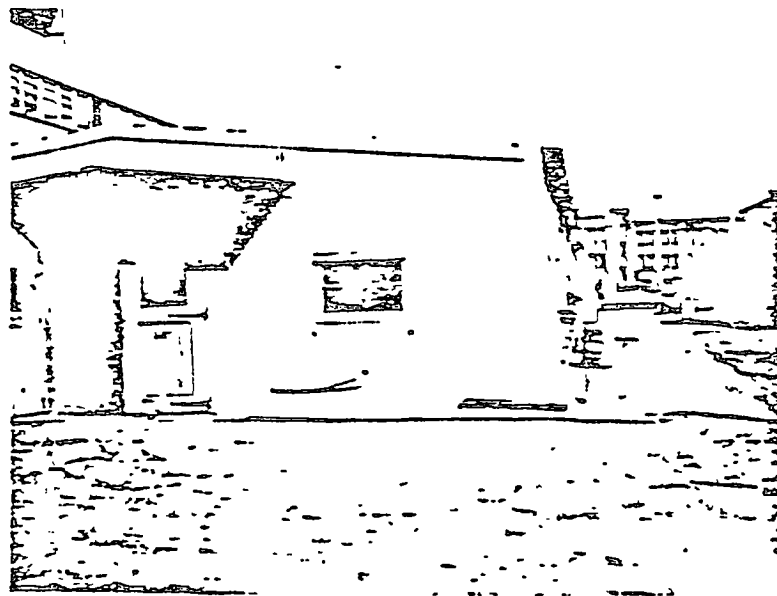


Fig. 3. South end of Building 163 and east side of Building 166.

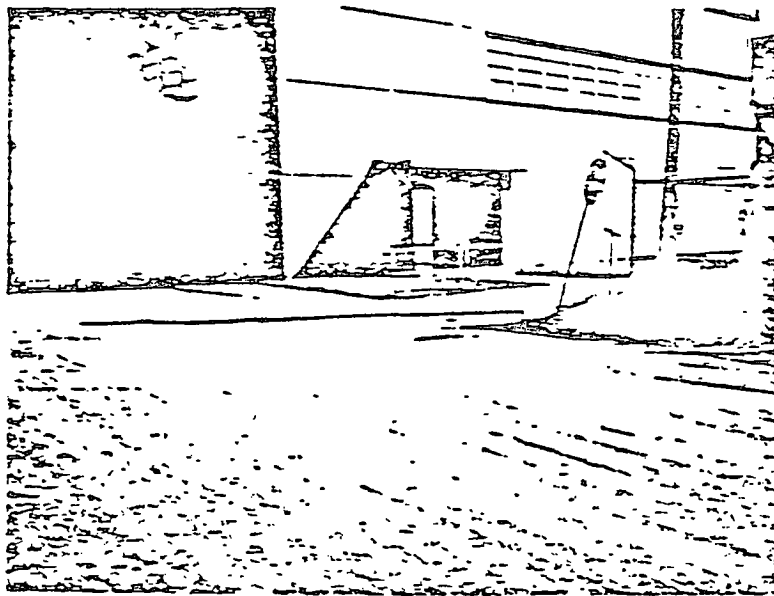


Fig. 4. Building 166.

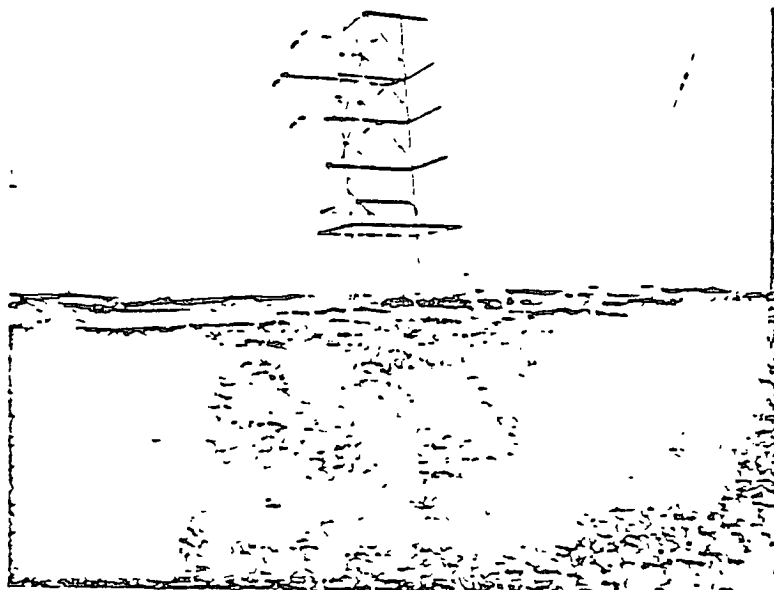


Fig. 5. Old Carbide Dump (now "Niagara Recycling").

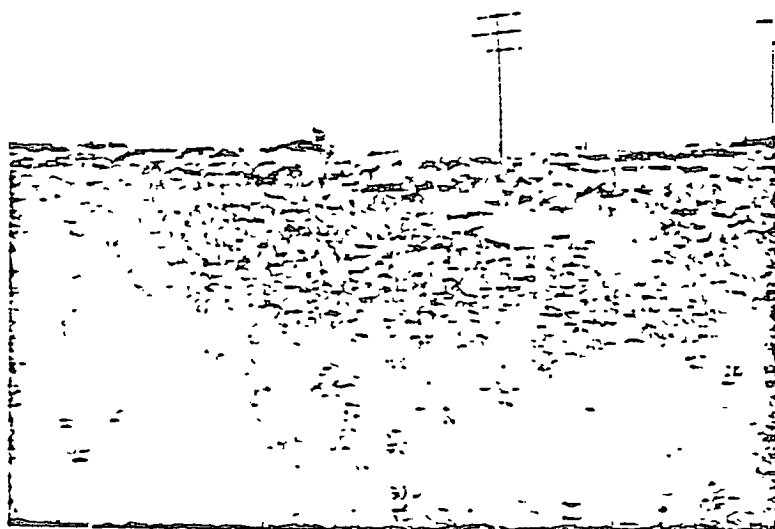


Fig. 6. Old Carbide Dump (now "Niagara Recycling").

Office Memorandum • UNITED STATES GOVERNMENT

TO : R. L. Kirk, Director,
Promotion Division

DATE September 28, 1953

FROM : W. B. Harris, Chief,
Industrial Hygiene Branch, Health & Safety Division

SUBJECT: DISMANTLEMENT OF ELECTROMET CO. CONTRACT NO. W-7405-ENG-14
DECONTAMINATION SURVEY OF AUGUST 11th and 14th, 1953.

SYMBOL: HSE:FSH

A resurvey of contamination was made by the Health and Safety Division in the standby green to metal plant of the Electromet Company, Niagara Falls, New York. This survey was made at the request of Mr. B. F. Fields, Electromet Plant Superintendent and our Administrative Operations and Legal Divisions in order to determine whether the radiation levels are being met before release from commission control.

On the visit of August 11, 1953, it was found that Electromet personnel were in the process of removing wooden structures around the vacuum casting furnaces, piping and other structural equipment. The results of the radiation survey of December 10-12 and the recommendations contained in the memo dated February 3, 1953, to F. M. Belmore from W. B. Harris re Decontamination were reviewed with Mr. Fields. In addition, decontamination procedures for removal of uranium contamination were discussed with plant personnel.

On August 14, 1953, a revisit to the plant was made to determine:

1. The degree of contamination of remaining equipment and the building proper.
2. Need for any additional recommendation for plant cleanup.

PROCEDURES

Direct radiation measurements were taken on all equipment, floors and walls of the plant using Electronic and Detection Beta-Gamma survey meters. Smear samples were taken from those locations and equipment at which high smears were found in the December, 1952 survey. The smears were taken over an area of 150 sq. cm. using 1-1/8" Whatman filter paper.

During cleanup operations and the contamination study general air samples were collected on 1-1/8" Whatman #11 filter paper, employing a universal sampler at 20 liters per minute as the basic equipment. The samples were taken in such former operations areas as the graphite burnout, vacuum casting as billet saw areas.

UCCNHT0000163

September 25, 1953

RESULTS OF SURVEY

Radiation target levels for decontamination have been revised since the December, 1952 survey due to a recommended increase in any beta exposure of five times the previous level. The criteria for decontamination which must be met by any buildings before release by NYDO are now:

1. The average gamma radiation at 3 feet from the floors or walls should not exceed 0.3 mr/hr. The average beta-gamma radiation measured in a like manner should not exceed 1.5 mreps/hr.
2. The maximum gamma radiation measured from the floors or walls should not exceed 0.6 mr/hr. The maximum beta-gamma radiation measured in a like manner should not exceed 3.0 mreps/hr.
3. No gamma radiation measured in contact with the floor should exceed 0.9 mr/hr. The maximum beta-gamma radiation measured in a contact with the floor should not exceed 4.5 mreps/hr.

Due to the nature of the survey instrument employed and the material measured, the field beta gamma intensities must be computed to the actual beta-gamma value using the expression:

$$B\gamma_{\text{actual}} = \frac{2 B\gamma_{\text{Field}}}{B\gamma_{\text{Field}}}$$

The attached table which contains the results of the computed direct radiation measurements and smear samples taken on equipment, walls, floors and other building structures reveals the following:

- (a) The highest gamma reading (0.1 mr/hr) was found on the floor of the old graphite burnout area. The concomitant $B\gamma$ measurement was only 1.7 mreps/hr.
- (b) The highest beta gamma contamination (4.4 mreps/hr) was found on the Racine cutting machine #931. Gamma contamination was negligible.
- (c) Mechanical saw #1630 was found to be contaminated with 4.0 mreps/hr beta gamma.
- (d) A high beta-gamma reading of 5.0 mreps/hr was found on the Lancaster mixer. Gamma contamination was negligible.

September 28, 1953

- (e) Vacuum casting equipment wooden platforms, and the former green mixing equipment were removed from the building at the time of this survey. This equipment and contaminated wood partitions were checked and found to be uranium contaminated. It was agreed by Mr. Fields and Dr. Spedding, project leader, that the wood partitions would be burned and ashes buried. Other equipment, such as furnace casting equipment and parts was to be sent to LOSA for storage and disposal.
- (f) All other equipment was found to meet the radiation target levels.

Of the eleven general air samples taken in the standby green to metal plant during cleanup operations only one sample (117α d/m/ m^3) exceeded the present acceptable level of 70α d/m/ m^3 . However, the average general air concentration for the eleven samples was only 18α d/m/ m^3 . The following table shows the average high and low general air concentrations found at specific locations:

Location	Concentration d/m/ m^3			Number of Samples
	Average	High	Low	
Center of area 20 ft. South of Machine Saw	12	25	2	4
Center of area 10' South vacuum casting area	7	14	3	3
At graphite burnout area	40	117	2	4

α d/m/ m^3 = alpha disintegrations per minutes per cubic meter of air.

CONCLUSION

This survey shows that a negligible degree of contamination both to equipment and to building has been measured. Since this contamination study was made during such major cleanup operations as demolition of floor by air hammer, sweeping, etc., and inasmuch as the criteria for uranium contamination has still been met by the plant, it is recommended that the plant be released by the government.

Three pieces of equipment, namely the Racine Cutter, Mechanical Saw and Lancaster mixer found to contain beta-gamma up to 5.0 meps/hr was scrubbed and sand blasted by Electromet personnel since this survey. Beta-gamma survey measurements by Dr. R. Spedding revealed no reduction in beta-gamma contamination.

September 26, 1953

The Electrometallurgical Co., according to Dr. Spedding, intends to use the aforementioned equipment in conjunction with their own radio metallurgy program. It is recommended that Electromet notify the NYOO they will agree not to sell the contaminated equipment to any third party and will not hold the NYOO responsible for any damaged incurred by Electromet personnel in using this equipment.

*if they are
not to use
the equipment
it is better to
just not
use it*

Att:

Table of Radiation Readings and Smear Results.

- ① *Are we going to use the equipment?*
- ② *This is correct, in it is, by both samples, classes in
fact?*
- ③ *What do we have to do to clean glass?*

TABLE OF DIRECT RADIATION READINGS AND SMEAR RESULTS

Location	Direct Radiation		Smear Sample
	(mrad/hr)	(mr/hr)	(α d/m/sample)
Entrance to Lab. 3' level	neg.	neg.	
Entrance to Lab. Floor (Kentile)	.04	neg.	74
Chem. Lab.-Lab Desk near door	.06	neg.	57
Chem. Lab. Cupboard	0.1	neg.	1.8
Chem. Lab. 3' level	neg.	neg.	
Chem. Lab.-Office Floor	.06	0.02	107
Chem. Lab. Office Wall	neg.	neg.	1.1
Corridor in front of Chem. lab. floor	neg.	neg.	
Vicinity Men's room-3' level	neg.	neg.	
Vicinity Men's room-floor	.06	neg.	52
Wall near men's room	0.1	neg.	72
Old graphite area- 3' level	.18	neg.	
Old graphite area- floor	1.7	0.1	187
Floor inside graphite burnout area	0.16	.04	10
3' level between vacuum furnace and wall	.07	.03	
Floor between vac. furnace and wall	.55	.04	432
Wall between vac. furnace and wall	.27	.03	234
3' level-Main entrance to plant	.02	neg.	
Floor- Main entrance	.12	neg.	174
Floor around cut-off saw 931	.12	neg.	44
Floor around cut-off saw 1630	.11	.01	38
Saw area 3' level	.04	neg.	
Near storage room 3' level	neg.	neg.	
Near storage room- floor	neg.	neg.	
Floor under former vac. furnace		neg.	216
platform	.75	.05	234
3' level at former vac. furnace platform area	.29	.01	
Buffalo room 3' level	neg.	.01	
Near Buffalo room (floor entrance)	.09	neg.	338
Lancaster Room-3' level	.06	.01	
Lancaster room-Wall	neg.	neg.	
Lancaster room-floor	.09	.01	
Ice crusher room-3' level	neg.	neg.	
Ice crusher room-floor	.18	neg.	
Old GFF furnace	.42	.02	
Vicinity of old GFF furnace	.35	.01	657
Old bomb break-out room-floor	.11	.01	66
Old jolter area of old break-out room-floor	.10	.01	66
Old jolter area of old break-out room-wall	.09	.01	21
Near main entrance of old break-out room- 3' level	1.54	.04	
Buffalo room- 3' level	0.08	.01	
Buffalo room-floor	1.06	neg.	338

TABLE OF DIRECT RADIATION READINGS AND SMEAR RESULTS

Name of Item	Govt. No.	Direct Radiation		Smear Sample	
		(Ci/m ² /hr)	X m/m	α	c/m/sample
Lancaster mixer	-	5.0	neg.		
Mechanical Sun	1630	4.0	neg.		
Racine cutting machine	931	4.4	neg.		
Fire Blanket	481	.12	neg.		
Stretcher	804	0.2	neg.		
Hydraulic lifter	165	2.0	neg.		
Crusher	1023	0.1	neg.		140
Hydrowin	483	.8	neg.		36
Truck	1220	.24	.02		291
Piping to Buffalo Forge		.12	.01		41
Buffalo forge	83	.44	.02		283
Buffalo Forge exhaust		.10	neg.		60

PRELIMINARY SURVEY OF THE UNION CARBIDE CORPORATION
METALS DIVISION PLANT, NIAGARA FALLS, NEW YORK

Work performed
by the
Health and Safety Research Division
Oak Ridge National Laboratory
Oak Ridge, Tennessee 37830

December 1980

OAK RIDGE NATIONAL LABORATORY
operated by
UNION CARBIDE CORPORATION
for the
DEPARTMENT OF ENERGY
as part of the
Formerly Utilized Sites--
Remedial Action Program

PRELIMINARY SURVEY OF THE UNION CARBIDE CORPORATION
METALS DIVISION PLANT, NIAGARA FALLS, NEW YORK

B. A. Berven and R. W. Doane

Introduction

On September 24, 1980, two representatives from Oak Ridge National Laboratory visited Union Carbide Corporation's Metal Division Plant (UCC-MD) in Niagara Falls, New York. The purpose of the visit was to perform a radiological survey of property where anomalously high levels of radiation were observed during an earlier preliminary survey of this site (see attachment). This report presents the results of this radiological survey.

A diagram of the technology area of the UCC-MD plant is shown in Fig. 1. The location of the anomalous radiation levels was between Buildings 163 and 166 where beta-gamma dose-rate levels were measured at 0.1 mrad/h at the ground surface.

Survey Methods

The preliminary radiological survey of the UCC-MD Technology Area consisted of the following measurements or samples: (1) a gamma-ray scan of the outside ground surface; (2) two bias surface soil samples from outside locations where external gamma radiation levels were significantly above background; (3) a gamma-ray scan of the inside floor and wall surfaces of Building 163; (4) bias alpha measurements inside Building 163 where external gamma radiation levels were significantly above background; (5) five smear samples from inside Building 163 measuring transferable alpha and beta contamination.

Portable instrumentation used in this survey included a gamma-ray scintillator [NaI (Tl)] survey meter, an alpha scintillation [ZnS (Ag)] counter, and a Geiger-Mueller (G-M) survey meter.

Survey Results

Outside

The gamma-ray scanning of the ground surface in the Technology Area at UCC-MD indicated wide-spread contamination over an extensive portion of this property (see shaded area in Fig. 2). Relatively high concentrations

of gamma-emitting radionuclides were observed in localized areas. External gamma exposure rates on ground surfaces were measured, ranging from background (approximately 10 $\mu\text{R/h}$) to a maximum of 3 mR/h. The contamination appeared to be low-level but uniform under several asphalt pads, and high-level and "spotty" following two railroad spurs traversing the property.

The highest external gamma levels (3 mrad/h)* observed in the area where surface soil sample NF₁ (see Fig. 3) was located. Potentially contaminated material appeared to be located beneath the asphalt pads surrounding Buildings 163 and 171. Surface exposure rates were a general 30 $\mu\text{R/h}$ around Building 171, but appeared to be highly variable around Building 163, ranging from 17 to 100 $\mu\text{R/h}$.

The location of two surface soil samples (0-15 cm) taken in the Technology Area are shown in Fig. 3. The results are listed below:

Sample	External Gamma Exposure Rate at Ground Surface ($\mu\text{R/h}$)	Radionuclide Concentration (pCi/g)		
		²³⁸ U	²²⁶ Ra	²³² Th
NF ₁	3000	3200 \pm 3%	3300 \pm 4.8%	860 \pm 7.1%
NF ₂	83	81 \pm 3%	72 \pm 1.7%	190 \pm 7.2%

The highest external gamma readings were found at the surface of the soil, with the levels decreasing rapidly with increasing depth.

Inside Building 163

Low-level contamination was found inside Building 163 during a cursory survey. The surface external gamma levels from the walls and floor were within typical background ranges (13 to 17 $\mu\text{R/h}$). The alpha activity on the walls and floor were elevated but not significantly above background levels at 68 dpm/100 cm².

Cracks in the floor of Building 163 exhibited elevated radiation levels, with external gamma activities ranging from 17 to 50 $\mu\text{R/h}$, and alpha activity over these cracks ranging from 100 to 150 dpm/100 cm².[†]

*This exceeds Nuclear Regulatory Commission's maximum beta-gamma level guideline of 1.0 mrad/h at 1 cm (see Ref. 1).

†This exceeds Nuclear Regulatory Commission's guideline of 100 dpm/100 cm² for alpha activity originating from ²²⁶Ra (see Ref. 1).

Five smear samples were taken to determine the amount of transferable alpha and beta contamination. The location of the smear samples are identified in Fig. 4. The levels of transferable alpha and beta-gamma contamination were all at background levels.

At location "b", surface external gamma levels measured 83 $\mu\text{R/h}$ and alpha activity measured approximately 530 dpm/100 cm^2 (also above NRC guidelines). At location "c", beta-gamma levels of 0.12 mrad/n were observed.

Discussion

Relatively high concentrations of radionuclides in the ^{232}Tn and ^{238}U decay chains exist in the surface soil in the Technology Area at UCC-MD in Niagara Falls, New York. These materials also appear in cracks and seams in the walls and floor of Building 163.

Dr. C. R. Allenback, Manager of Environmental, Health, and Product Safety Affairs at the UCC-MD, indicated thorium-bearing ores were used during operations at this site, however, these operations were unrelated to Manhattan Engineer District (MED)/Atomic Energy Commission (AEC) activities. In view of the nature of past MED/AEC operations (limited to reacting of UF_6 to uranium metal), it seems unlikely that the present contamination on-site is related to those MED/AEC activities. However, because uranium appears to be present in the soil in significant amounts, contamination due to MED/AEC activities cannot be eliminated, but only considered improbable.

Recommendations

Based on the results of this preliminary survey, it is recommended that a formal detailed radiological survey of the Technology Area at the UCC-MD Plant in Niagara Falls, New York, be conducted by some responsible agency since radiation levels exceed Nuclear Regulatory Commission guidelines for unrestricted use.

References

Nuclear Regulatory Commission, "Guidelines for Decontamination of Facilities or Equipment Prior to Release for Unrestricted Use or Termination of Licenses for By-Product, Source, or Special Nuclear Material," November 1976.

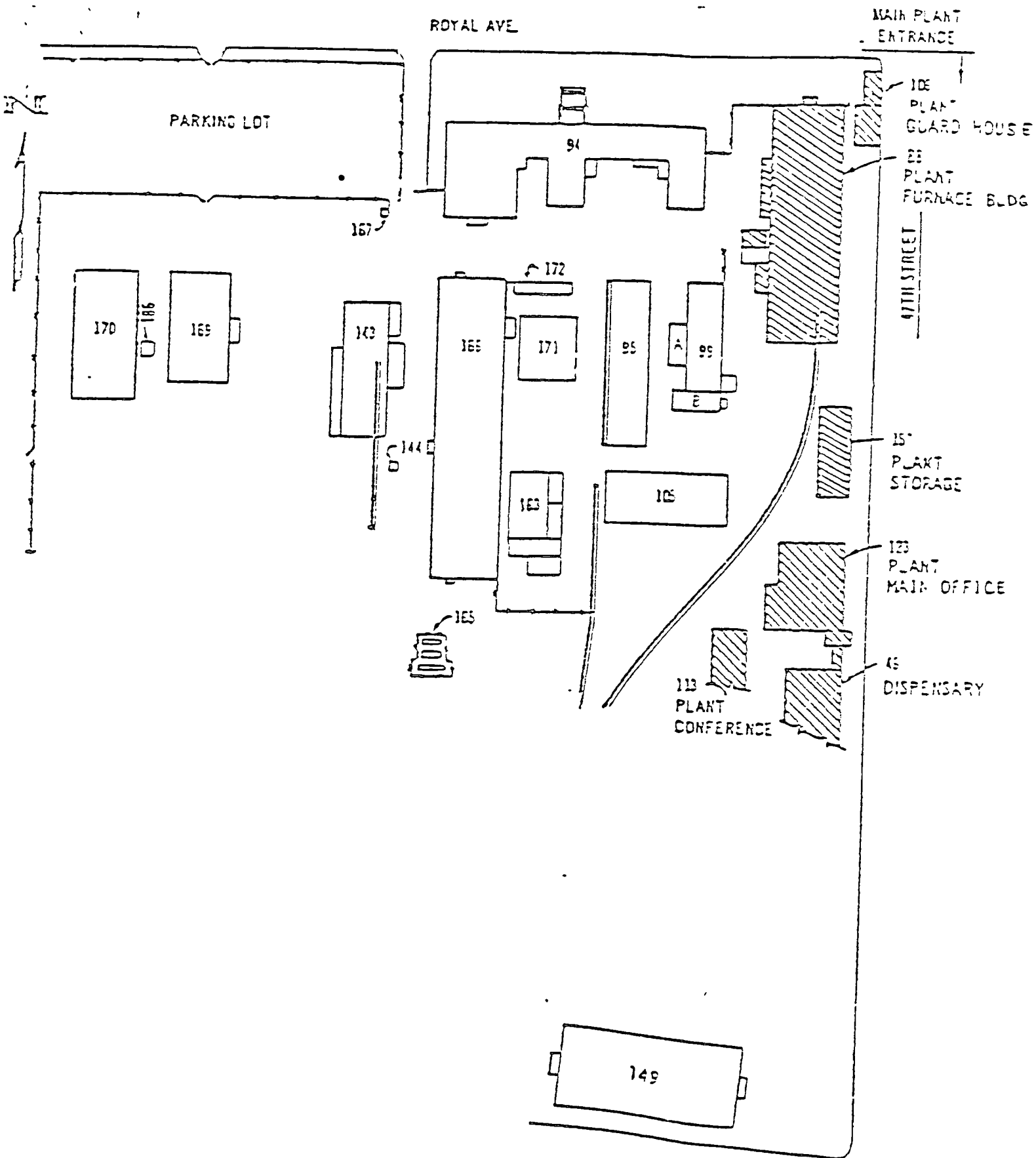


Fig. 1. Technology Area at the Union Carbide Corporation - Metals Division Plant (former Electromet site) in Niagara Falls, NY (adapted from UCC-MD drawing).

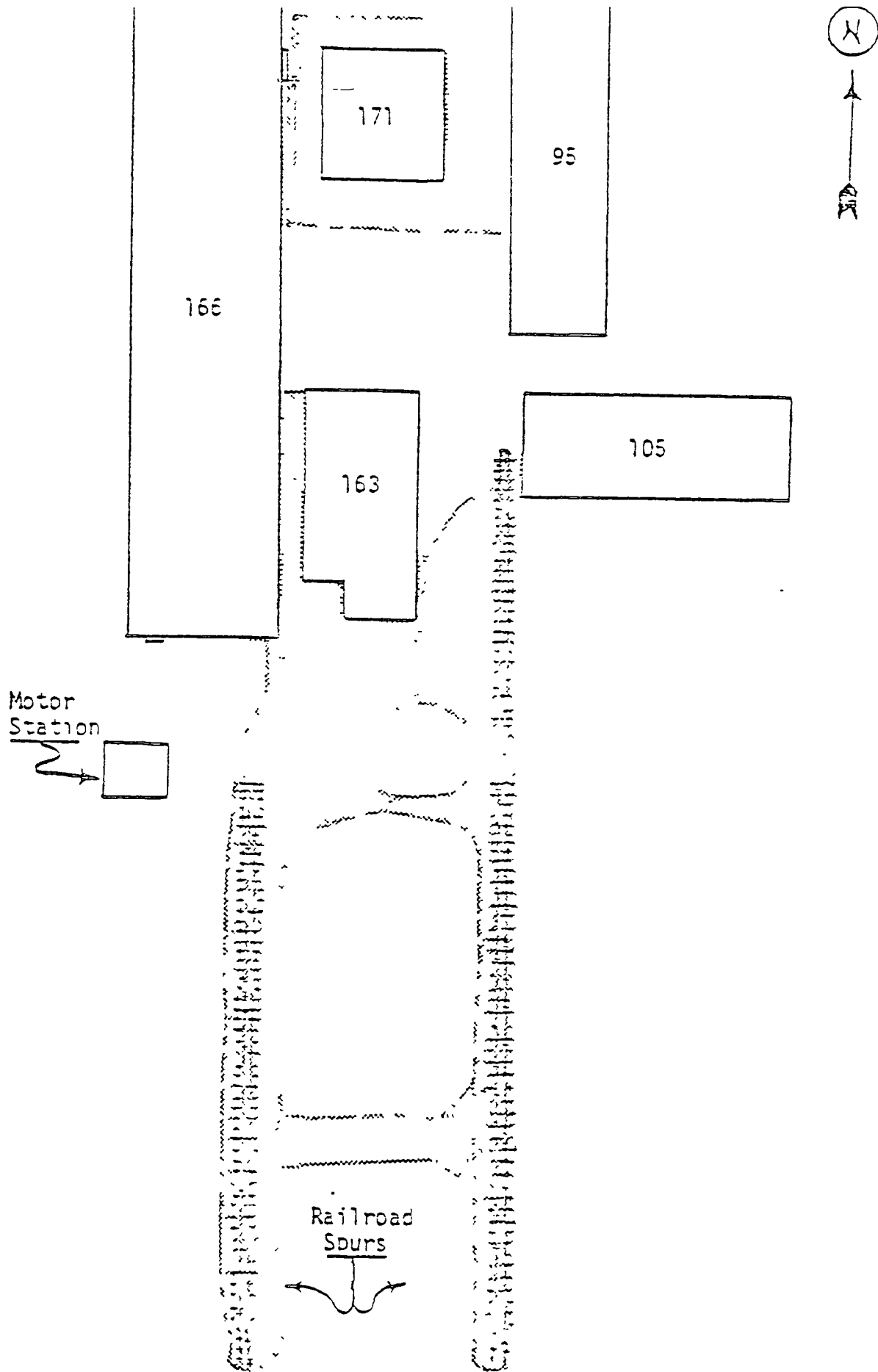


Fig. 2. Location of elevated surface gamma-ray levels (indicated by shading) in the Technology Area at UCC-MD, Niagara Falls, NY.

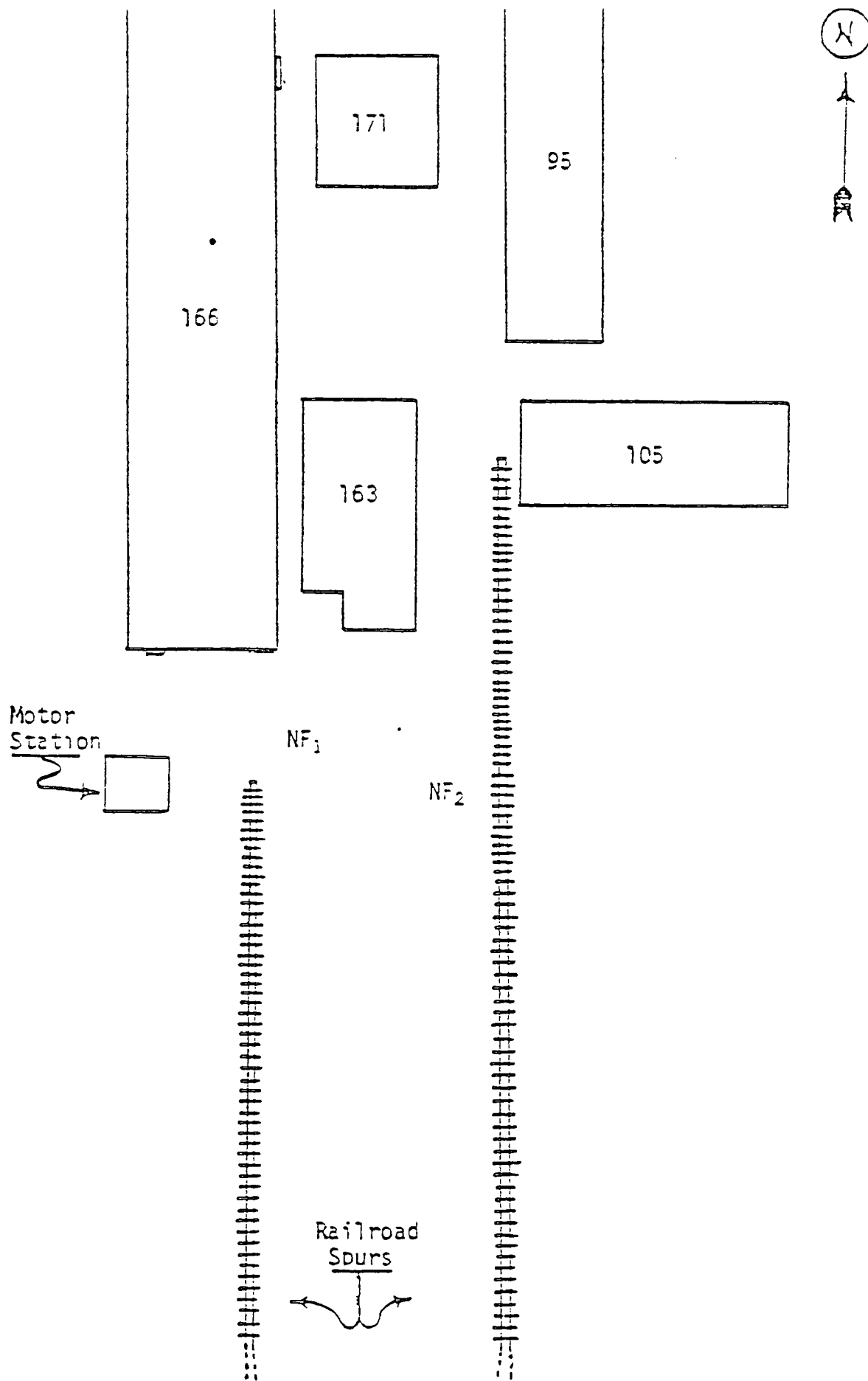


Fig. 3. Location of surface soil samples taken in the Technology Area of UCC-MD in Niagara Falls, NY.

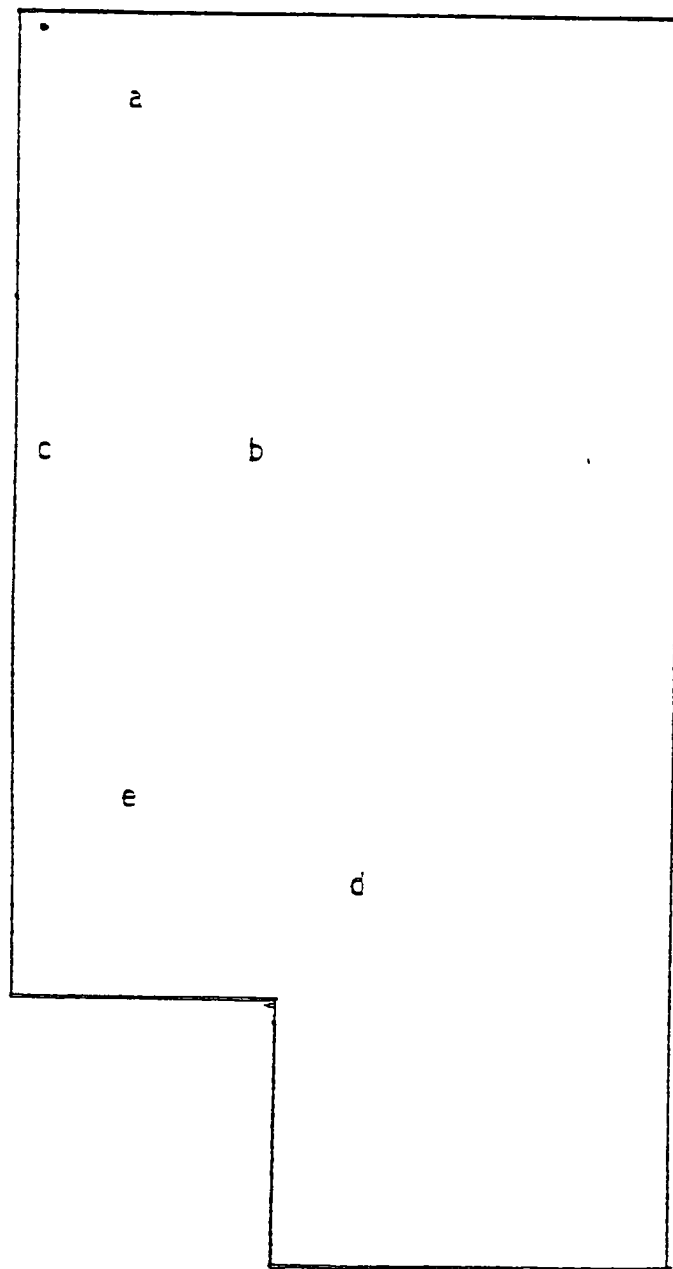


Fig. 4. Location of smear samples in Building 163 in the Technology Area of UCC-MD in Niagara Falls, NY.

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SANBORN, N Y 14132

SANBORN 731-3635

March 31, 1986

Union Carbide Corp.
P.O. Box 66
137 47th Street
Niagara Falls N.Y. 14302
Attn: Mr. Ronald Sullivan

P.O. #615-03051
Charge #14523-20301

Tesr Holes

2/28/86	Moved our machine on job site	\$ 30.00
	1 labor 1 hr @ \$14.00 per hr	\$ 14.00
3/20/86	Moved our tractor on job site	\$ 30.00
	Backhoe w/operator 4 hrs. @ \$30.00 per hr	\$ 120.00
	Total due this bill	<u>\$ 194.00</u>
	Thank You!	

AR Sullivan
4/7/86

TERMS ~~30 days net~~, 30 days net, 2% per month on unpaid balance

UCCNHT0000177

Umetco Minerals Corporation



PO BOX 579, 4625 ROYAL AVENUE • NIAGARA FALLS NEW YORK 14302

January 31, 1986

Dr. F. J. Bradley
Department of Labor
State of New York
Two World Trade Center
New York, NY 10047

Subject: Termination of Radioactive Materials License 950-0139

Dear Dr. Bradley:

Umetco Minerals is in the process of being sold (target date of March 31, 1986). At that time the Technology Department will cease to exist and I will take retirement. We are particularly anxious that Radioactive Material License 950-0139 be terminated prior to this date so that the area in question can be restored to unrestricted use.

Correspondence concerning the decontamination has been directed through Mr. Robert F. Kelly, Senior Radiologist, New York State Department of Labor, Buffalo, NY. The analytical results were submitted on July 25, 1985, and documentation that the contaminated soil had been shipped to Barnwell, South Carolina and Uravan, Colorado was mailed August 19, 1985.

On December 6, 1985 I phoned your office and was informed that our request for termination was on the desk and that notification of termination would be forthcoming shortly. I realize that you are swamped with work and have a sizeable backlog of material to process. However, I would be very grateful for anything you might do to get our request to the top of the pile.

In anticipation of your help I offer sincerest thanks.


Donald J. Hansen
Assistant Director - Technology

mau/320h

COPIES: Messrs:
R. F. Kelly
George Kasyk

Blind Copies Messrs: D. G. Millenbruch. F. V. McMillen. R. L. Miller
H. B. Rhodes T. J. Kagetsu: C. T. Wentzel

UCCNHT0000178

Umetco Minerals Corporation



PO BOX 579 4625 ROYAL AVENUE • NIAGARA FALLS NEW YORK 14302

August 19, 1985

Mr. Robert F. Kelly
Senior Radiologist
New York State - Department of Labor
State Office Building
65 Court Street
Buffalo, NY 14202

attachments

Subject: Radioactive Materials License 950-0139 & *Niagara Cleanup*

Dear Mr. Kelly:

As you requested in a telephone call on August 15, 1985, we are submitting documentation for all shipments of radioactive materials from the Niagara cleanup site.


Fifteen shipments were made to Barnwell, South Carolina as shown in the attached shipping memoranda and Barnwell's "Radioactive Shipment Manifest Form."

Eleven shipments were made to Uravan, Colorado as shown on the attached shipping memoranda for processing prior to disposal at the uranium tailings pile in accordance with Colorado Department of Health requirements.

We understand that with the submittal of the above information the license will be terminated.

Thank you for your help on this matter.

Very truly yours,



Donald J. Hansen
Assistant Director-Technology

/mau/264h
Attachments

Blind Copies: Messrs: R. G. Beverly, L. G. Evans w/a, T. J. Kagetsu w/a,
D. G. Millenbruch, R. L. Miller

UCCNHT0000179